



BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XA509]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Marine Site Characterization Surveys

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an incidental harassment authorization (IHA) to Ørsted Wind Power North America, LLC, (Ørsted) to incidentally harass, by Level B harassment only, marine mammals during marine site characterization surveys in coastal waters from New York to Massachusetts in the areas of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0486/0517, OCS-A 0487, and OCS-A 0500) and along potential export cable routes to shoreline locations from New York to Massachusetts.

DATES: This authorization is valid from September 25, 2020 through September 24, 2021.

FOR FURTHER INFORMATION CONTACT: Carter Esch, Office of Protected Resources, NMFS, (301) 427-8421. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained by

visiting the Internet at: www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the “take” of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed incidental take authorization may be provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other “means of effecting the least practicable adverse impact” on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stocks for taking for certain subsistence uses (referred to in shorthand as “mitigation”); and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

Summary of Request

On April 15, 2020, NMFS received a request from Ørsted for an IHA to take marine mammals incidental to marine site characterization surveys in the OCS-A 0486/0517, OCS-A 0487, and OCS-A 0500 Lease Areas designated and offered by the Bureau of Ocean Energy Management (BOEM) as well as along one or more export cable routes (ECRs) between the southern portions of the Lease Areas and shoreline locations from New York to Massachusetts, to support the development of offshore wind projects. NMFS deemed the application to be adequate and complete on July 1, 2020. Ørsted's request is for take, by Level B harassment only, of small numbers of 15 species or stocks of marine mammals. Neither Ørsted nor NMFS expects serious injury or mortality to result from this activity and the activity is expected to last no more than one year; therefore, an IHA is appropriate.

NMFS previously issued an IHA to Ørsted for similar activities (84 FR 52464, October 2, 2019); Ørsted has complied with all the requirements (*e.g.*, mitigation, monitoring, and reporting) of that IHA.

Description of Activity

Overview

The purpose of the marine site characterization surveys in the Lease Areas and ECRs (herein Survey Area) is to obtain a baseline assessment of seabed/sub-surface soil conditions in the Survey Area to support the siting of potential future offshore wind projects. Underwater sound, produced by high-resolution geophysical (HRG) survey equipment, resulting from Ørsted's site characterization surveys, has the potential to result in incidental take of marine mammals. This take of marine mammals is expected to

be in the form of harassment and no serious injury or mortality is anticipated, nor is any authorized in this IHA. Ørsted will conduct continuous HRG survey operations 12-hours per day (daylight only in shallow, nearshore locations) and 24-hours per day (offshore) using multiple vessels. Based on the planned 24-hours operations, the survey activities for all survey segments would require 1,302 vessel days if one vessel were surveying the entire survey line continuously. However, an estimated 5 vessels may be used simultaneously, with a maximum of no more than 9 vessels. Therefore, all the survey effort will be completed in one year.

A detailed description of Ørsted's survey activities, including types of survey equipment planned for use, is provided in the notice of the proposed IHA (85 FR 48179; August 10, 2020). Since that time, no changes have been made to the activities; therefore, a detailed description is not provided here. Please refer to that notice for the description of the specified activity. Mitigation, monitoring, and reporting measures are described in detail later in this document (please see Mitigation and Monitoring and Reporting below).

Comments and Responses

A notice of NMFS's proposal to issue an IHA to Ørsted was published in the **Federal Register** on August 10, 2020 (85 FR 48179). That notice described, in detail, Ørsted's activity, the marine mammal species that may be affected by the activity, and the anticipated effects on marine mammals. During the 30-day public comment period, NMFS received comment letters from the Marine Mammal Commission (Commission) and a group of environmental non-governmental organizations (ENGOS). The ENGOS' letter was submitted jointly by the Natural Resources Defense Council, National Wildlife Federation, Conservation Law Foundation, Mass Audubon, Friends of the Earth, All our

Energy, Wildlife Conservation Society, NY4WHALES, Defenders of Wildlife, Southern Environmental Law Center, Surfrider Foundation, WDC Whale and Dolphin Conservation, Inland Ocean Coalition, Gotham Whale, International Fund for Animal Welfare, Marine Mammal Alliance Nantucket, and Seatuck Environmental Association. NMFS has posted the comments online at: www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable. A summary of the public comments received from the Commission and ENGOs, as well as NMFS' responses to those comments, are below. Please see the comment letters, available online, for full details of the comments and rationale.

Comment 1: The Commission recommended that NMFS consider whether IHAs are necessary for HRG surveys given the size of the lease-stipulated Exclusion Zones (200 m, cetaceans and pinnipeds; 500 m North Atlantic right whales), which would minimize the potential for marine mammals to be exposed to sound levels expected to result in taking. The Commission suggested that NMFS overestimates Level B harassment zones, and that the lease-stipulated Exclusion Zones are adequate. As such, the Commission believes that the issuance of an incidental harassment authorization is unnecessary.

Response (waiting on feedback from OPR)

Comment 2: The ENGOs suggested that it should be NMFS' top priority to consider any initial data from passive acoustic monitoring data, opportunistic marine mammal sightings data, and other data sources, because the models used by NMFS do not adequately capture increased use of the survey areas by North Atlantic right whales. Further, these commenters state that the density models NMFS uses result in an

underestimate of take, and do not fully reflect the abundance, distribution, and density of marine mammals for the U.S. East Coast.

Response: NMFS will review any recommended data sources and will continue to use the best available information. We welcome future input from interested parties on data sources that may be of use in analyzing the potential presence and movement patterns of marine mammals, including North Atlantic right whales, in New England waters. NMFS used the best scientific information available at the time the analyses for the proposed IHA were conducted—in this case the marine mammal density models developed by the Duke Marine Geospatial Ecology Lab (MGEL) (Roberts *et al.* 2016, 2017, 2018)—to inform our determinations in the IHA. The ENGOs are correct in their statement that North Atlantic right whale distribution has shifted in recent years. An updated North Atlantic right whale density model, recently released by Roberts *et al.* (2020), shows that the density of North Atlantic right whales in the Survey Area is approximately one third higher than was considered in the proposed IHA. We have adjusted the take estimates accordingly in the final IHA. In addition, we have shifted the Seasonal Restrictions from March through June to January through May, which will limit to three the number of vessels that can operate within the Survey Area during that timeframe. This mitigation measure will reduce the impact of survey activities, during the timeframe in which densities are highest in the Survey Area (Roberts 2020) and North Atlantic right whales have been consistently observed south of Martha's Vineyard (Pettis *et al.*, 2020).

Comment 3: The ENGOs recommended that NMFS should carefully analyze the cumulative impacts on the North Atlantic right whale and other protected species from

the proposed survey activities and other survey activities contemplated in other lease areas, and ensure appropriate mitigation of the cumulative impacts. In addition, the ENGOs suggest that NMFS advance a programmatic incidental take regulation for site characterization activities.

Response: The MMPA grants exceptions to its broad take prohibition for a “specified activity.” 16 U.S.C. 1371(a)(5)(A)(i). Cumulative impacts (also referred to as cumulative effects) is a term that appears in the context of the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA), but it is defined differently in those contexts. Neither the MMPA nor NMFS' codified implementing regulations address consideration of other unrelated activities and their impacts on populations. However, the preamble for NMFS' implementing regulations (54 FR 40338; September 29, 1989) states, in response to comments, that the impacts from other past and ongoing anthropogenic activities are to be incorporated into the negligible impact analysis via their impacts on the baseline. Accordingly, NMFS here has factored into its negligible impact analysis the impacts of other past and ongoing anthropogenic activities via their impacts on the baseline (*e.g.*, as reflected in the density/distribution and status of the species, population size and growth rate, and other relevant stressors).

Comment 4: The ENGOs asserted that the agency's assumptions regarding mitigation effectiveness are unfounded and cannot be used to justify any reduction in the number of takes authorized for North Atlantic right whales. The reasons cited include: (i) the agency's reliance on a 160 dB threshold for behavioral harassment that is not supported by the best available scientific information; (ii) the agency relies on the assumption that marine mammals will take measures to avoid the sound even though

studies have not found avoidance behavior to be generalizable among species and contexts, and despite the possibility that avoidance may itself constitute take under the MMPA; and (iii) the mitigation and monitoring protocols prescribed by the agency are inadequate at protecting marine mammals and do not comply with the MMPA.

Response: The three comments provided by the ENGOs are addressed individually below.

(i) NMFS acknowledges that the 160-dB rms step-function approach is simplistic, and that an approach reflecting a more complex probabilistic function may more effectively represent the known variation in responses at different levels due to differences in the receivers, the context of the exposure, and other factors. The commenters suggested that our use of the 160-dB threshold implies that we do not recognize the science indicating that animals may react in ways constituting behavioral harassment when exposed to lower received levels. However, we do recognize the potential for Level B harassment at exposures to received levels below 160 dB rms, in addition to the potential that animals exposed to received levels above 160 dB rms will not respond in ways constituting behavioral harassment (e.g., Malme *et al.*, 1983, 1984, 1985, 1988; McCauley *et al.*, 1998, 2000a, 2000b; Barkaszi *et al.*, 2012; Stone, 2015a; Gailey *et al.*, 2016; Barkaszi and Kelly, 2018). These comments appear to evidence a misconception regarding the concept of the 160-dB threshold. While it is correct that in practice it works as a step-function, *i.e.*, animals exposed to received levels above the threshold are considered to be “taken” and those exposed to levels below the threshold are not, it is in fact intended as a sort of mid-point of likely behavioral responses (which are extremely complex depending on many factors including species, noise source,

individual experience, and behavioral context). What this means is that, conceptually, the function recognizes that some animals exposed to levels below the threshold will in fact react in ways that are appropriately considered take, while others that are exposed to levels above the threshold will not. Use of the 160-dB threshold allows for a simplistic quantitative estimate of take, while we can qualitatively address the variation in responses across different received levels in our discussion and analysis.

As behavioral responses to sound depend on the context in which an animal receives the sound, including the animal's behavioral mode when it hears sounds, prior experience, additional biological factors, and other contextual factors, defining sound levels that disrupt behavioral patterns is extremely difficult. Even experts have not previously been able to suggest specific new criteria due to these difficulties (*e.g.*, Southall *et al.* 2007; Gomez *et al.*, 2016).

(ii) The ENGOS disagreed with NMFS' assumption that marine mammals move away from sound sources. The ENGOS claimed that studies have not found avoidance behavior to be generalizable among species and contexts, and even though avoidance may itself constitute take under the MMPA. Importantly, the commenters mistakenly seem to believe that the NMFS' does not consider avoidance as a take, and that the concept of avoidance is used as a mechanism to reduce overall take—this is not the case. Avoidance of loud sounds is a well-documented behavioral response, and NMFS often accordingly accounts for this avoidance by reducing the number of injurious exposures, which would occur in very close proximity to the source and necessitate a longer duration of exposure. However, when Level A harassment takes are reduced in this manner, they are changed to Level B harassment takes, in recognition of the fact that this avoidance or

other behavioral responses occurring as a result of these exposures are still take, NMFS does not reduce the overall amount of take as a result of avoidance.

(iii) The ENGOs questioned the effectiveness of the mitigation and monitoring measures proposed to be authorized, and NMFS' prior authorization of a reduced number of takes for North Atlantic right whales (relative to the estimated value) based on the anticipated protection afforded by mitigation measures. They specifically recommended that seasonal restrictions should be established and consideration should be given to species for which an unusual mortality event (UME) has been declared. Note that NMFS is requiring Ørsted to comply with restrictions associated with identified seasonal management areas (SMA) and they must comply with dynamic management area restrictions (DMAs), if any DMAs are established near the Survey Area. Furthermore, we have established a 500-m shutdown zone for North Atlantic right whales, which is more than three times as large as the greatest Level B harassment isopleth calculated for the specified activities for this IHA (141 m). Additionally, Seasonal Restrictions from January through May will limit the number of vessel that can operate within the Survey Area, thus providing an additional protective measure for North Atlantic right whales. Similar mitigation and monitoring measures have previously been required in numerous HRG survey IHAs and have been successfully implemented. Finally, we made no reductions in authorized takes of North Atlantic right whales by Level B harassment in this IHA. Rather, as a result of incorporating the updated NARW density model data, the number of takes authorized for right whales has been increased from the amount in the proposed IHA (from 24 to 37).

Comment 5: The ENGOs recommended that HRG surveys should commence, with ramp-up, during daylight hours only, to maximize the probability that North Atlantic right whales detected and confirmed clear of the exclusion zone.

Response: We acknowledge the limitations inherent in detection of marine mammals at night. However, no injury is expected to result even in the absence of mitigation, given the very small estimated Level A harassment zones. Any potential impacts to marine mammals authorized for take would be limited to short-term behavioral responses. Restricting surveys in the manner suggested by the commenters may reduce marine mammal exposures by some degree in the short term, but would not result in any significant reduction in either intensity or duration of noise exposure. Vessels would also potentially be on the water for an extended time, introducing noise into the marine environment. The restrictions recommended by the commenters could result in the surveys spending increased time on the water, which may result in greater overall exposure to sound for marine mammals and increase the risk of a vessel strike; thus, the commenters have not demonstrated that such a requirement would result in a net benefit. Furthermore, restricting the applicant to ramp-up only during daylight hours would have the potential to result in lengthy shutdowns of the survey equipment, which could result in the applicant failing to collect the data they have determined is necessary and, subsequently, the need to conduct additional surveys the following year. This would result in significantly increased costs incurred by the applicant. Thus, the restriction suggested by the commenters would not be practicable for the applicant to implement. In consideration of potential effectiveness of the recommended measure and its

practicability for the applicant, NMFS has determined that restricting survey start-ups to daylight hours when visibility is unimpeded is not warranted or practicable in this case.

Comment 6: The ENGOs recommended that NMFS require monitoring an exclusion zone (EZ) for North Atlantic right whales of *at least* 500 meters (m), and ideally 1,000 m, around each vessel conducting activities with noise levels that could result in injury or harassment to this species.

Response: Regarding the recommendation for a 1,000 m EZ specifically for North Atlantic right whales, we have determined that the 500 m EZ, as required in the IHA, is sufficiently protective. We note that the 500 m EZ exceeds the modeled distance to the largest Level B harassment isopleth distance (141 m) by a substantial margin. Thus, we are not requiring shutdown if a right whale is observed beyond 500 m.

Comment 7: The ENGOs recommended that a combination of visual monitoring by PSOs and passive acoustic monitoring (PAM) should be used at all times. Since PSOs are unable to visually monitor the exclusion area during nighttime hours, the ENGOs also recommended that NMFS require, for efforts that continue into the nighttime, a combination of night-vision, thermal imaging, and PAM.

Response: There are several reasons why we do not agree that use of PAM is warranted for 24-hour HRG surveys such as the one planned by Ørsted. While NMFS agrees that PAM can be an important tool for augmenting detection capabilities in certain circumstances, its utility in further reducing impact for Ørsted's HRG survey activities is limited. First, for this activity, the area expected to be ensonified above the Level B harassment threshold is relatively small (a maximum of 141 m as described in the Estimated Take section) – this reflects the fact that, to start with, the source level is

comparatively low and the intensity of any resulting impacts would be lower level and, further, it means that inasmuch as PAM will only detect a portion of any animals exposed within a zone (see below), the overall probability of PAM detecting an animal in the harassment zone is low – together these factors support the limited value of PAM for use in reducing take with smaller zones. PAM is only capable of detecting animals that are actively vocalizing, while many marine mammal species vocalize infrequently or during certain activities, which means that only a subset of the animals within the range of the PAM would be detected (and potentially have reduced impacts). Additionally, localization and range detection can be challenging under certain scenarios. For example, odontocetes are fast moving and often travel in large or dispersed groups which makes localization difficult. In addition, the ability of PAM to detect baleen whale vocalizations is further limited because the PAM instruments are deployed from the stern of a vessel, which puts the PAM hydrophones in proximity to propeller noise and low frequency engine noise; this can mask the low frequency sounds emitted by baleen whales, including right whales.

Given that the effects to marine mammals from the types of surveys authorized in this IHA are expected to be limited to low level behavioral harassment even in the absence of mitigation, the limited additional benefit anticipated by adding this detection method (especially for right whales and other low frequency cetaceans, species for which PAM has limited efficacy), and the cost and impracticability of implementing a full-time PAM program, we have determined the current requirements for visual monitoring are sufficient to ensure the least practicable adverse impact on the affected species or stocks and their habitat.

As stated in the proposed IHA, Ørsted is required to use night-vision equipment (*i.e.*, night-vision goggles and/or infrared technology) during night time monitoring.

Comment 8: The ENGOs recommended that NMFS should require developers to operate sub-bottom profilers at power settings that achieve the lowest practicable source level for the objective.

Response: Ørsted has selected the equipment necessary to achieve their objectives. We have evaluated the effects expected as a result of use of this equipment, made the necessary findings, and imposed mitigation requirements sufficient to achieve the least practicable adverse impact on the affected species and stocks of marine mammals. It is not within NMFS' purview to make judgments regarding what constitutes the "lowest practicable source level" for an operator's survey objectives.

Comment 9: The ENGOs recommended that all project vessels operating within or transiting to/from the Survey Area, regardless of size, observe a mandatory 10 knot speed restriction during the entire survey period.

Response: NMFS does not concur with these measures. NMFS has analyzed the potential for ship strike resulting from Ørsted's activity and has determined that the mitigation measures specific to ship strike avoidance are sufficient to avoid the potential for ship strike. These include: a requirement that all vessel operators comply with 10 knot (18.5 km/hour) or less speed restrictions in any established DMA or SMA; a requirement that all vessel operators reduce vessel speed to 10 knots (18.5 km/hour) or less when any large whale, mother/calf pairs, pods, or large assemblages of non-delphinid cetaceans are observed within 100 m of an underway vessel; a requirement that all survey vessels maintain a separation distance of 500 m or greater from any sighted North Atlantic right

whale; and a requirement that, if underway, vessels must steer a course away from any sighted North Atlantic right whale at 10 knots or less until the 500 m minimum separation distance has been established. We have determined that the ship strike avoidance measures are sufficient to ensure the least practicable adverse impact on species or stocks and their habitat. Furthermore, no documented vessel strikes have occurred for any HRG surveys which were issued IHAs from NMFS.

Comment 10. The ENGOs objected to NMFS' process to consider extending any one-year IHA (which includes a truncated 15-day comment period), stating that it is contrary to the MMPA.

Response: NMFS' IHA Renewal process meets all statutory requirements. All IHAs issued, whether an initial IHA or a Renewal IHA, are valid for a period of not more than one year. And the public has at least 30 days to comment on all proposed IHAs, with a cumulative total of 45 days for IHA Renewals. As noted above, the *Request for Public Comments* section made clear that the agency was seeking comment on both the initial proposed IHA and the potential issuance of a Renewal for this project. Because any Renewal (as explained in the *Request for Public Comments* section) is limited to another year of identical or nearly identical activities in the same location (as described in the *Description of Proposed Activity* section) or the same activities that were not completed within the one-year period of the initial IHA, reviewers have the information needed to effectively comment on both the immediate proposed IHA and a possible one-year Renewal, should the IHA holder choose to request one in the coming months.

While there will be additional documents submitted with a Renewal request, for a qualifying Renewal these will be limited to documentation that NMFS will make available

and use to verify that the activities are identical to those in the initial IHA, are nearly identical such that the changes would have either no effect on impacts to marine mammals or decrease those impacts, or are a subset of activities already analyzed and authorized but not completed under the initial IHA. NMFS will also confirm, among other things, that the activities will occur in the same location; involve the same species and stocks; provide for continuation of the same mitigation, monitoring, and reporting requirements; and that no new information has been received that would alter the prior analysis. The Renewal request will also contain a preliminary monitoring report, to verify that effects from the activities do not indicate impacts of a scale or nature not previously analyzed. The additional 15-day public comment period provides the public an opportunity to review these few documents, provide any additional pertinent information and comment on whether they think the criteria for a Renewal have been met. Between the initial 30-day comment period on these same activities and the additional 15 days, the total comment period for a Renewal is 45 days.

Comment 11: The ENGOs recommended that NMFS develop, and subsequently require, a robust and effective real-time monitoring and mitigation system for North Atlantic right whales and other endangered and protected species (*e.g.*, fin whales, sei whales, humpback whales).

Response: NMFS is generally supportive of this concept. A network of near real-time baleen whale monitoring devices are active or have been tested in portions of New England and Canadian waters. These systems employ various digital acoustic monitoring instruments which have been placed on autonomous platforms including slocum gliders, wave gliders, profiling floats and moored buoys. Systems that have proven to be

successful will likely see increased use as operational tools for many whale monitoring and mitigation applications.

NOAA Fisheries recently published “Technical Memorandum NMFS-OPR-64: North Atlantic Right Whale Monitoring and Surveillance: Report and Recommendations of the National Marine Fisheries Service’s Expert Working Group” which is available at: <https://www.fisheries.noaa.gov/resource/document/north-atlantic-right-whale-monitoring-and-surveillance-report-and-recommendations>. This report summarizes a workshop NOAA Fisheries convened to address objectives related to monitoring North Atlantic right whales and presents the Expert Working Group’s recommendations for a comprehensive monitoring strategy to guide future analyses and data collection. Among the numerous recommendations found in the report, the Expert Working Group encouraged the widespread deployment of auto-buoys to provide near real-time detections of North Atlantic right whale calls that visual survey teams can then respond to for collection of identification photographs or biological samples. Ørsted must consult NMFS’ North Atlantic right whale reporting systems for the presence of North Atlantic right whales throughout survey operations and for the establishment of a Dynamic Management Area (DMA), and is immediately to report a sighting of a North Atlantic right whale to the NMFS North Atlantic Right Whale Sighting Advisory System.

Changes from the Proposed IHA to the Final IHA

As described above, NMFS increased the authorized take of North Atlantic right whales based on an updated density model that was released after the publication of the proposed IHA in the **Federal Register**. Table 4, 5, and 6 reflect the updated densities, take estimates by Survey Area segment, and total authorized take by Level B harassment

for NARWs, respectively. In addition, the Seasonal Restrictions (see **Mitigation** section) timeframe was shifted from March through June to January through May, during which Ørsted must limit to three the number of vessels operating in the Survey Area.

Description of Marine Mammals in the Area of Specified Activity

Sections 3 and 4 of the IHA application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the affected species. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments) and more general information about these species (e.g., physical and behavioral descriptions) may be found on NMFS' website (www.fisheries.noaa.gov/find-species).

All species that could potentially occur in the Survey Area are included in Table 6 of the IHA application. However, the temporal and/or spatial occurrence of several species listed in Table 6 of the IHA application is such that take of these species is not expected to occur, because they have very low densities in the Survey Area and/or are extralimital to the Survey Area. These are: the blue whale (*Balaenoptera musculus*), Cuvier's beaked whale (*Ziphius cavirostris*), four species of Mesoplodont beaked whale (*Mesoplodon* spp.), dwarf and pygmy sperm whale (*Kogia sima* and *Kogia breviceps*), short-finned pilot whale (*Globicephala macrorhynchus*), northern bottlenose whale (*Hyperoodon ampullatus*), killer whale (*Orcinus orca*), pygmy killer whale (*Feresa attenuata*), false killer whale (*Pseudorca crassidens*), melon-headed whale (*Peponocephala electra*), striped dolphin (*Stenella coeruleoalba*), white-beaked dolphin

(*Lagenorhynchus albirostris*), pantropical spotted dolphin (*Stenella attenuata*), Fraser's dolphin (*Lagenodelphis hosei*), rough-toothed dolphin (*Steno bredanensis*), Clymene dolphin (*Stenella clymene*), spinner dolphin (*Stenella longirostris*), hooded seal (*Cystophora cristata*), and harp seal (*Pagophilus groenlandicus*). As take of these species is not anticipated as a result of the planned activities, these species are not analyzed further. In addition, the Florida manatee (*Trichechus manatus*) may be found in the coastal waters of the Survey Area. However, Florida manatees are managed by the U.S. Fish and Wildlife Service and are not considered further in this document.

Table 1 summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2020). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no mortality is anticipated or authorized, PBR and serious injury or mortality from anthropogenic sources are included here as a gross indicator of the status of the species.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' Atlantic SARs (e.g., Hayes *et al.*, 2020). All values presented in Table 1 are the most recent available at the

time of publication and are available online at: www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region.

Table 1. Marine Mammals Known to Occur in the Survey Area That May be Affected by Ørsted's HRG Survey Activity

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR ³	Annual M/SI ³
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenidae						
North Atlantic right whale	<i>Eubalaena glacialis</i>	Western North Atlantic	E/D; Y	428 (0; 418; n/a)	0.8	6.85
Family Balaenopteridae (rorquals)						
Humpback whale	<i>Megaptera novaeangliae</i>	Gulf of Maine	-/-; N	1,396 (0; 1,380; See SAR)	22	12.15
Fin whale	<i>Balaenoptera physalus</i>	Western North Atlantic	E/D; Y	7,418 (0.25; 6,029; See SAR)	12	2.35
Sei whale	<i>Balaenoptera borealis</i>	Nova Scotia	E/D; Y	6,292 (1.015; 3,098; see SAR)	6.2	1
Minke whale	<i>Balaenoptera acutorostrata</i>	Canadian East Coast	-/-; N	24,202 (0.3; 18,902; See SAR)	189	8.2
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Physeteridae						
Sperm whale	<i>Physeter macrocephalus</i>	NA	E; Y	4,349 (0.28; 3,451; See SAR)	3.9	0
Family Delphinidae						
Long-finned pilot whale	<i>Globicephala melas</i>	Western North Atlantic	-/-; Y	39,215 (0.30; 30,627)	306	21

Bottlenose dolphin	<i>Tursiops truncatus</i>	Western North Atlantic Offshore	-/-; N	62,851 (0.23; 51,914; See SAR)	519	28
Common dolphin	<i>Delphinus delphis</i>	Western North Atlantic	-/-; N	172,825 (0.21; 145,216; See SAR)	1,452	419
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	Western North Atlantic	-/-; N	93,233 (0.71; 54,443; See SAR)	544	26
Atlantic spotted dolphin	<i>Stenella frontalis</i>	Western North Atlantic	-/-; N	39,921 (0.27; 32,032; 2012)	320	0
Risso's dolphin	<i>Grampus griseus</i>	Western North Atlantic	-/-; N	35,493 (0.19; 30,289; See SAR)	303	54.3
Family Phocoenidae (porpoises)						
Harbor porpoise	<i>Phocoena phocoena</i>	Gulf of Maine/Bay of Fundy	-/-; N	95,543 (0.31; 74,034; See SAR)	851	217
Order Carnivora – Superfamily Pinnipedia						
Family Phocidae (earless seals)						
Gray seal ⁴	<i>Halichoerus grypus</i>	Western North Atlantic	-/-; N	27,131 (0.19; 23,158, 2016)	1,389	5,410
Harbor seal	<i>Phoca vitulina</i>	Western North Atlantic	-/-; N	75,834 (0.15; 66,884, 2018)	2,006	350

1 - Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

2 - NMFS marine mammal stock assessment reports online at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region/>. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable.

3 - Potential biological removal, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population size (OSP). Annual M/SI, found in NMFS' SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, subsistence hunting, ship strike). Annual M/SI values often cannot be determined precisely and is in some cases presented as a minimum value. All M/SI values are as presented in the 2020 SARs (Hayes *et al.*, 2020).

4 - NMFS stock abundance estimate applies to U.S. population only, actual stock abundance is approximately 505,000.

A detailed description of the species likely to be affected by Ørsted's activities, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence were provided in the notice of the proposed IHA (85 FR 48179; August 10, 2020). Since that time, we are not aware of any changes in the status (under the MMPA or ESA) of these species and stocks; therefore, detailed descriptions are not provided here. Please refer to that notice for these descriptions. Please also refer to NMFS' website (www.fisheries.noaa.gov/find-species) for generalized species accounts.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

The effects of underwater noise from Ørsted's survey activities have the potential to result in behavioral harassment of marine mammals in the vicinity of the Survey Area. The notice of proposed IHA (85 FR 48179; August 10, 2020) included a discussion of the effects of anthropogenic noise on marine mammals and the potential effects of underwater noise from Ørsted's survey activities on marine mammals and their habitat. That information and analysis is incorporated by reference into this final IHA determination and is not repeated here; please refer to the notice of proposed IHA (85 FR 48179; August 10, 2020) for more details.

Estimated Take

This section provides an estimate of the number of incidental takes authorized through this IHA, which will inform both NMFS' consideration of "small numbers" and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA

defines “harassment” as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment), or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would be by Level B harassment only, in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to noise from certain HRG sources. Based on the nature of the activity and the anticipated effectiveness of the mitigation measures (*i.e.*, exclusion zones and shutdown measures), discussed in detail below in **Mitigation** section, Level A harassment or and/or mortality is neither anticipated nor authorized. Below we describe how the take is estimated.

Generally speaking, we estimate take by considering: (1) acoustic thresholds recommended by NMFS for use in evaluating when marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment, (2) the area or volume of water that will be ensonified above these levels in a day, (3) the density or occurrence of marine mammals within these ensonified area, and (4) and the number of days of activities. We note that while these basic factors can contribute to a rudimentary calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.*, previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the take estimate.

Acoustic Thresholds

NMFS recommends use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (*e.g.*, hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 120 dB re 1 microPascal root mean square (μPa rms) for continuous (*e.g.*, vibratory driving, drilling) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent, non-impulsive (*e.g.*, scientific sonar) sources. Ørsted's survey activity includes the use of impulsive (*i.e.*, boomers and sparkers) and intermittent, non-impulsive sources (*e.g.*, non-parametric sub-bottom profilers); therefore, the 160 dB re 1 μPa (rms) threshold is applicable.

Level A harassment - NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (NMFS, 2018)

identifies dual criteria thresholds to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The components of Ørsted's planned activity that may result in take of marine mammals include the use of impulsive (*e.g.*, boomers or sparkers) and intermittent, non-impulsive (*e.g.*, non-parametric sub-bottom profilers) sources. The thresholds described above are provided in Table 2. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2018 Technical Guidance, which may be accessed at: www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.

Table 2. Thresholds identifying the onset of Permanent Threshold Shift

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	<i>Cell 1</i> $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	<i>Cell 2</i> $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	<i>Cell 3</i> $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	<i>Cell 4</i> $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	<i>Cell 5</i> $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	<i>Cell 6</i> $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	<i>Cell 7</i> $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	<i>Cell 8</i> $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	<i>Cell 9</i> $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	<i>Cell 10</i> $L_{E,OW,24h}$: 219 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 μPa , and cumulative sound exposure level (L_E) has a reference value of 1 $\mu\text{Pa}^2\text{s}$. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript “flat” is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds (L_E) indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here we describe operational and environmental parameters of the activity that will contribute to identifying the area ensonified above the acoustic thresholds, which include sources levels and a transmission loss coefficient.

NMFS has developed a user-friendly methodology for determining the rms sound pressure level (SPL_{rms}) at the 160-dB isopleth for the purposes of estimating the extent of Level B harassment isopleths associated with HRG survey equipment (NMFS, 2020).

This methodology incorporates frequency and some directionality to refine estimated ensonified zones of influence (ZOIs). Ørsted used NMFS’s methodology with additional modifications to incorporate a seawater absorption formula and account for energy emitted outside of the primary beam of the source. For sources that operate with different beam widths, the maximum beam width was used, and the lowest frequency of the source was used when calculating the absorption coefficient. Please see Table 3 of the IHA application for detailed information about HRG acoustic source parameters.

NMFS considers the data provided by Crocker and Fratantonio (2016) to represent the best available information on source levels associated with HRG equipment

and, therefore, recommends that source levels provided by Crocker and Fratantonio (2016) be incorporated in the method described above to estimate isopleth distances to the Level A and Level B harassment thresholds. In cases when the source level for a specific type of HRG equipment is not provided in Crocker and Fratantonio (2016), NMFS recommends that either the source levels provided by the manufacturer be used, or, in instances where source levels provided by the manufacturer are unavailable or unreliable, a proxy from Crocker and Fratantonio (2016) be used instead. Table 3 of the IHA application details HRG equipment types that may be used during the planned surveys, and the associated sound levels.

Results of modeling using the methodology described above indicated that, of the HRG survey equipment planned for use by Ørsted that has the potential to result in Level B harassment of marine mammals, sound produced by the Applied Acoustics Dura-Spark UHD sparkers and GeoMarine Geo-Source sparker would propagate furthest to the Level B harassment threshold (141 m; Table 3). As described above, only a portion of Ørsted's survey activity days will employ boomers or sparkers; therefore, for the purposes of the exposure analysis, it was assumed that sparkers would be the dominant acoustic source for approximately 701 of the total 1,302 survey activity days. For the remaining 601 survey days, the TB Chirp III (54 m; Table 3) was assumed to be the dominant source. Thus, the distances to the isopleths corresponding to the threshold for Level B harassment for sparkers (141 m) and the TB Chirp III (54 m) were used as the basis of the take calculation for all marine mammals for 54% and 46% of survey activity days, respectively.

Table 3. Modeled Radial Distances from HRG Survey Equipment to Isopleths Corresponding to Level A Harassment and Level B Harassment Thresholds

Sound Source	Radial Distance to Level A Harassment Threshold (m)*				Radial Distance to Level B Harassment Threshold (m)
	Low frequency cetaceans	Mid frequency cetaceans	High frequency cetaceans	Phocid pinnipeds (underwater)	All marine mammals
ET 216 CHIRP	<1	<1	2.9	0	12
ET 424 CHIRP	0	0	0	0	4
ET 512i CHIRP	0	0	<1	0	6
GeoPulse 5430	<1	<1	36.5	<1	29
TB CHIRP III	<1	<1	16.9	<1	54
Innomar Parametric SBPs	<1	<1	1.7	<1	4
AA Triple plate S-Boom (700/1,000 J)	<1	0	4.7	<1	76
AA, Dura-spark UHD (500 J/400 tip)	<1	0	2.8	<1	141
AA, Dura-spark UHD 400+400	<1	0	2.8	<1	141
GeoMarine, Geo-Source dual 400 tip sparker	<1	0	2.8	<1	141
Pangeo Acoustic Corer (LF CHIRP)	<1	0	<1	<1	4
Pangeo Acoustic Corer (HF CHIRP)	<1	<1	<1	<1	4
USBL (all models)	0	0	1.7	0	50

* AA = Applied Acoustics; CHIRP = Compressed High-Intensity Radiated Pulse; ET = EdgeTech; SBP = Sub-bottom Profiler; TB = Teledyne Benthos; UHD = Ultra-high Definition; USBL = Ultra-short Baseline. Distances to the Level A harassment threshold based on the larger of the dual criteria (peak SPL and SEL_{cum}) are shown.

Isopleth distances to Level A harassment thresholds for all types of HRG equipment and all marine mammal functional hearing groups were modeled using the NMFS User Spreadsheet and NMFS Technical Guidance (2018), which provides a conservative approach to exposure estimation. The dual criteria (peak SPL and SEL_{cum}) were applied to impulsive HRG sources using the modeling methodology described above, and the isopleth distances for each functional hearing group were then carried

forward in the exposure analysis. For the GeoMarine Geo-Source dual 400 tip sparker, Applied Acoustics Triple plate S-Boom and Dura-Spark models, the peak SPL metric resulted in larger isopleth distances for the high frequency hearing group. Distances to the Level A harassment thresholds for all equipment types are shown in Table 3.

Distances to the Level A harassment threshold for Innomar were calculated using a Matlab-based numerical model, which accounts for the source's extremely narrow beam width. Cumulative sound exposure level from a moving source to an assumed stationary marine mammal was calculated based on the safe distance method described in Sivle et al. (2015), with modifications to include absorption loss and beamwidth. The cumulative received level was then frequency weighted using the NMFS (2018) frequency weighting function for each marine mammal functional hearing group. Finally, the safe horizontal distance (*i.e.*, isopleth distance to the Level A harassment threshold) was determined numerically at a point where the SEL_{cum} would not exceed the 24-hour SEL_{cum} .

Modeled distances to isopleths corresponding to the Level A harassment threshold are very small (< 1 m) for three of the four marine mammal functional hearing groups that may be impacted by the survey activities (*i.e.*, low frequency and mid frequency cetaceans, and phocid pinnipeds; see Table 3). Based on the extremely small Level A harassment zones for these functional hearing groups, the potential for species within these functional hearing groups to be taken by Level A harassment is considered so low as to be discountable. These three functional hearing groups encompass all but one of the marine mammal species that may be impacted by the planned activities, listed in Table 1. There is one species (harbor porpoise) within the high frequency functional hearing group

that may be impacted by the planned activities. However, the largest modeled distance to the Level A harassment threshold for the high frequency functional hearing group was only 36.5 m (Table 3), and this estimate is assumed to be conservative. Level A harassment would also be more likely to occur at close approach to the sound source or as a result of longer duration exposure to the sound source, and mitigation measures – including a 100 m exclusion zone for harbor porpoises – are expected to minimize the potential for close approach or longer duration exposure to active HRG sources. In addition, harbor porpoises are a notoriously shy species which is known to avoid vessels. Harbor porpoises would also be expected to avoid a sound source prior to that source reaching a level that would result in injury (Level A harassment). Therefore, we have determined that the potential for take by Level A harassment of harbor porpoises is so low as to be discountable. As NMFS has determined that the likelihood of take of any marine mammals in the form of Level A harassment occurring as a result of the surveys is so low as to be discountable, we therefore do not authorize the take by Level A harassment of any marine mammals. For more information about Level A harassment exposure estimation, please see section 6.2.1 of the IHA application.

Marine Mammal Occurrence

The habitat-based density models produced by the Duke University Marine Geospatial Ecology Laboratory (Roberts *et al.*, 2016a,b, 2017, 2018) and Roberts (2020) represent the best available information regarding marine mammal densities in the Survey Area. The density data presented by Roberts *et al.* (2016a,b, 2017, 2018) and Roberts (2020) incorporates aerial and shipboard line-transect survey data from NMFS and other organizations and incorporates data from 8 physiographic and 16 dynamic

oceanographic and biological covariates, and controls for the influence of sea state, group size, availability bias, and perception bias on the probability of making a sighting. These density models were originally developed for all cetacean taxa in the U.S. Atlantic (Roberts *et al.*, 2016a,b). In subsequent years, certain models have been updated based on additional data as well as certain methodological improvements. More information is available online at seamap.env.duke.edu/models/Duke-EC-GOM-2015/. Marine mammal density estimates in the Survey Area (animals/km²) were obtained using the most recent model results for all taxa (Roberts *et al.*, 2016b, 2017, 2018) and Roberts (2020). The updated models incorporate additional sighting data, including sightings from the NOAA Atlantic Marine Assessment Program for Protected Species (AMAPPS) surveys from 2010–2014 (NEFSC & SEFSC, 2011, 2012, 2014a, 2014b, 2015, 2016). In addition, Roberts (2020) further updates model results for NARWs by implementing three major changes: increasing spatial resolution, generating monthly estimates for three time periods of survey data, and dividing the study area into five discrete regions. These changes are designed to produce estimates that better reflect the most current, regionally specific data, including observations collected during aerial surveys in the Massachusetts and Rhode Island Wind Energy Areas, conducted by the New England Aquarium from February 2017 through June 2018 (Quintana et al., 2019). More information, including the initial model results and supplementary information for each model, is available online at seamap.env.duke.edu/models/Duke-EC-GOM-2015/.

For the exposure analysis, density data from Roberts *et al.* (2016b, 2017, 2018) and Roberts (2020) were mapped using a geographic information system (GIS). Density grid cells that included any portion of the Survey Area were selected for all survey

months. Densities for the recently split Lease Areas OCS-A 0486 and OCS-A 0517 were combined, as the Lease Areas occupy the same habitat and densities and, therefore, overlap. For each of the Survey Area segments (*i.e.*, OCS-A 0486/0517, OCS-A 0487, OCS-A 0500, and ECR Area), the densities of each species as reported by Roberts *et al.* (2016b, 2017, 2018) and Roberts (2020) were averaged by month; those values were then used to calculate a mean annual density for each species for each segment of the Survey Area. Estimated mean monthly and annual densities (animals per km²) of all marine mammal species that may be taken by the survey activities, for all segments of the Survey Area, are shown in Tables 8, 9, 10, and 11 of the IHA application. The mean annual density values used to estimate take numbers are shown in Table 4 below.

For bottlenose dolphin densities, Roberts *et al.* (2016b 2017, 2018) does not differentiate by stock. The Western North Atlantic northern migratory coastal stock primarily occurs in coastal waters from the shoreline to approximately the 20 m isobath (Hayes *et al.*, 2018). As the Survey Area is located north of the northern extent of the range of the Western North Atlantic Migratory Coastal Stock and within depths exceeding 20 m, where only the offshore stock would be expected to occur, all calculated bottlenose dolphin exposures within the Survey Area are expected to be from the offshore stock. Similarly, Roberts *et al.* (2018) produced density models for all seals but did not differentiate by seal species. Because the seasonality and habitat use by gray seals roughly overlaps with that of harbor seals in the Survey Area, it was assumed that the mean annual density of seals could refer to either of the respective species and was, therefore, divided equally between the two species.

Table 4. Mean Annual Marine Mammal Densities (Number of Animals per 100 km²) in the Survey Area

Species	OCS-A 0486/0517	OCS-A 0487	OCS-A 0500	ECR Area
North Atlantic right whale	0.26	0.29	0.27	0.12
Humpback whale	0.14	0.13	0.12	0.05
Fin whale	0.21	0.26	0.27	0.15
Sei whale	0.01	0.01	0.02	0.01
Minke whale	0.05	0.06	0.07	0.04
Sperm Whale	0.01	0.01	0.01	0.01
Pilot whale	0.16	0.33	0.68	0.37
Bottlenose dolphin	1.17	0.77	0.72	3.51
Common dolphin	4.68	7.58	4.40	2.60
Atlantic white-sided dolphin	1.46	2.55	3.86	1.98
Atlantic spotted dolphin	0.01	0.02	0.05	0.05
Risso's dolphin	0.00	0.00	0.01	0.01
Harbor porpoise	3.44	4.62	5.65	3.20
Gray seal	0.73	0.70	0.65	1.59
Harbor seal	0.73	0.70	0.65	1.59

Note: All density values derived from Roberts *et al.* (2016b, 2017, 2018) and Roberts (2020). Densities shown represent the mean annual density values.

Take Calculation and Estimates

Here we describe how the information provided above was brought together to produce a quantitative take estimate. In order to estimate the number of marine mammals predicted to be exposed to sound levels that would result in harassment, radial distances to predicted isopleths corresponding to Level B harassment thresholds were calculated, as described above. Those distances were then used to calculate the area(s) around the HRG survey equipment predicted to be ensonified to sound levels that exceed harassment thresholds. The area estimated to be ensonified to relevant thresholds in a single day was then calculated, based on areas predicted to be ensonified around the HRG survey equipment and the estimated trackline distance traveled per day by the survey vessel. The daily ensonified area was multiplied by the mean annual density of a given marine

mammal species for each Survey Area segment. This value was then multiplied by the number of planned vessel days.

As noted previously, not all noise producing survey equipment/sources will be operated concurrently by each survey vessel on every vessel day. The greatest distance to the Level B harassment threshold for impulsive sources (*e.g.*, boomers and sparkers) is 141 m, while the greatest distance to the Level B harassment threshold for intermittent, non-impulsive sources (*e.g.*, CHIRPs, Innomar, USBL) is 54 m. Therefore, the distance used to estimate take by Level B harassment was 141 m for the portion of survey days (54%) employing boomers and sparkers and 54 m for the portion of survey days (46%) when only non-impulsive sources will be used.

Ørsted estimates that the surveys will achieve a maximum daily track line distance of 70 km per 24-hour day during the HRG survey activity days; this distance accounts for the vessel traveling at approximately 4.0 kn, during active survey periods only. Estimates of incidental take by Level B harassment for impulsive and non-impulsive HRG equipment were calculated using the 141 m and 54 m Level B harassment isopleths, respectively, to determine the daily ensonified areas for 24-hour operations (impulsive 19.8 km²; non-impulsive 7.659 km²), estimated daily vessel track of approximately 70 km, and the relevant species density, multiplied by the number of survey days estimated for the specific Survey Area segment (Tables 5 and 6).

Ørsted will establish a 500 m exclusion zone for the North Atlantic right whale, which substantially exceeds the distance to the Level B harassment isopleth for both survey days using impulsive sources (141 m) and survey days using non-impulsive sources (54 m). However, Ørsted will be operating 24 hours per day for a majority of the

total of 1,302 vessel days. Even with the implementation of mitigation measures (including visual monitoring at night with use of night vision devices), it is reasonable to assume that night time operations for an extended period could result in a limited number of North Atlantic right whales being exposed to underwater sound exceeding Level B harassment levels. Take has been conservatively calculated based on the largest isopleth for both types of survey days (*i.e.*, using impulsive or non-impulsive sources), and is thereby likely an overestimate because the acoustic source resulting in the largest isopleth would not be used on 100 percent of survey days for each category. In addition, Ørsted will implement specific mitigation and monitoring protocols for both types of survey days (*e.g.*, night vision goggles with thermal clip-ons for nighttime operations, exclusion zones, ramp-up and shutdown protocols). NMFS predicts that, in the absence of mitigation, 37 North Atlantic right whales may be taken by Level B harassment throughout the Survey Area over the 12-month project duration. The conservative estimate of exposure at Level B harassment levels coupled with the monitoring and mitigation measures make it likely that this prediction is an overestimate.

As described above, NMFS has determined that the likelihood of take of any marine mammals in the form of Level A harassment occurring as a result of the surveys is so low as to be discountable; therefore, we do authorize take of any marine mammals by Level A harassment.

Table 5. Numbers of Potential Incidental Take by Level B Harassment of Marine Mammals in Each of the Survey Segments by Survey Type and Duration (*I = Impulsive; NI = Non-impulsive).

	Estimated takes by Level B harassment							
	OCS-A 0486/0517		OCS-A 0487		OCS-A 0500		ECR Area	
Survey type	I*	NI*	I	NI	I	NI	I	NI
Vessel days	114	103	97	164	112	52	378	283
Species								
North Atlantic right whale	5.87	2.02	5.57	3.60	5.99	1.06	8.98	2.57
Humpback whale	3.16	1.09	2.50	1.61	2.66	0.47	3.74	1.07
Fin whale	4.74	1.64	4.99	3.23	5.99	1.06	11.23	3.21
Sei whale	0.23	0.08	0.19	0.12	0.44	0.08	0.75	0.21
Minke whale	1.13	0.39	1.15	0.74	1.55	0.28	3.0	0.86
Sperm whale	0.02	0.08	0.19	0.12	0.22	0.04	0.75	0.21
Long-finned pilot whale	3.61	1.25	6.34	4.10	15.08	2.68	27.69	7.93
Bottlenose dolphin (W. N. Atlantic Offshore)	26.40	9.12	14.79	9.56	15.97	2.83	262.70	75.19
Common dolphin	105.64	36.49	145.58	94.09	97.57	17.32	194.59	55.69
Atlantic white-sided dolphin	32.96	11.38	48.98	31.65	85.60	15.19	148.19	42.41
Atlantic spotted dolphin	0.23	0.08	0.45	0.25	1.11	0.20	3.74	1.07
Risso's dolphin	0.00	0.00	0.00	0.00	0.22	0.04	0.75	0.21
Harbor porpoise	77.65	26.82	88.73	57.35	125.29	22.24	239.50	68.54
Gray seal	16.48	5.69	13.44	8.69	14.41	2.56	119.00	34.06
Harbor seal	16.48	5.69	13.44	8.69	14.41	2.56	119.00	34.06

Table 6. Numbers of Potential Incidental Take of Marine Mammals Authorized and Takes as a Percentage of Population

Species	Estimated takes by Level B harassment	Total authorized takes by Level B harassment	Total authorized takes as a percentage of population
North Atlantic right whale	37	37	8.64
Humpback whale ¹	16	21	1.50
Fin whale	36	36	0.49
Sei whale	2	2	0.03
Minke whale ¹	9	13	0.05
Sperm whale ¹	2	3	0.07
Long-finned pilot whale	69	69	0.18
Bottlenose dolphin (W.N. Atlantic Offshore) ²	417	419	0.67
Common dolphin ^{1,2}	747	2,211	1.28
Atlantic white-sided dolphin ²	416	418	0.45
Atlantic spotted dolphin	7	7	0.02
Risso's dolphin ¹	1	30	0.08
Harbor porpoise ²	706	916	0.96
Harbor seal ²	214	215	0.28
Gray seal ²	214	215	0.79

1 The authorized takes (Level B harassment only) for these species has been increased from the estimated take number to mean group size (Risso's dolphin: Palka (2012); sperm whale: Barkaszi and Kelly (2018)) or increased based on PSO sighting observations from Ørsted's HRG survey activities in the same Survey Area in 2019 and 2020 (humpback and minke whales, and common dolphins).

2 Total authorized take by Level B harassment has been increased to include modeled exposures resulting from estimation of take by Level A harassment, which is not anticipated (see Section 6.2.1 of the IHA application).

Ørsted has requested additional take, by Level B harassment, authorizations beyond the modelled takes for humpback and minke whales and common dolphins, based on increased detection of these species during its 2019 survey. Ørsted's justification for this request can be found in its application, which is available here:

<https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act>.

Mitigation

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned), and

(2) the practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

The mitigation measures described below are consistent with those required and successfully implemented under previous incidental take authorizations issued in association with HRG survey activities. Modeling was performed to estimate ZOIs (see “Estimated Take”); these ZOI values were used to inform mitigation measures for HRG survey activities to eliminate Level A harassment and minimize Level B harassment, while providing estimates of the areas within which Level B harassment might occur.

In addition to the specified measures described below, Ørsted will conduct briefings for vessel operators and crews, the marine mammal monitoring teams, and when new personnel join the work, in order to explain responsibilities, communication procedures, the marine mammal monitoring protocol, and operational procedures.

Pre-start Clearance, Exclusion and Monitoring Zones

Marine mammal exclusion zones (EZs) will be established around impulsive acoustic sources (*e.g.*, boomers and sparkers) and non-impulsive, non-parametric sub-bottom profilers and monitored by protected species observers (PSOs):

- 500 m EZ for North Atlantic right whales for use of impulsive acoustic sources (*e.g.*, boomers and/or sparkers) and non-impulsive, non-parametric sub-bottom profilers; and

- 100 m EZ for all other marine mammals for use of impulsive acoustic sources (*e.g.*, boomers and/or sparkers), with the exception of certain small delphinids specified below.

If a marine mammal is detected approaching or entering the EZs during the HRG survey, the vessel operator will adhere to the shutdown procedures described below to minimize noise impacts on the animals. Pre-start clearance, ramp-up and shutdown procedures (described below) are not required during HRG survey operations using only non-impulsive sources, excluding non-impulsive, non-parametric sub-bottom profilers. Pre-clearance and ramp-up, but not shutdown, are required when using non-impulsive, non-parametric sub-bottom profilers. These stated requirements will be included in the site-specific training to be provided to the survey team.

Pre-start Clearance of the Exclusion Zones

Ørsted will implement a 30-minute pre-start clearance period of the specified EZs prior to the initiation of ramp-up of boomers, sparkers, and non-impulsive, non-parametric sub-bottom profilers. During this period, the EZs will be monitored by the PSOs, using the appropriate visual technology. Ramp-up may not be initiated if any marine mammal(s) is within its respective EZ. If a marine mammal is observed within an EZ during the pre-start clearance period, ramp-up may not begin until the animal(s) has been observed exiting its respective EZ or until an additional time period has elapsed with no further sighting (*i.e.*, 15 minutes for small odontocetes and seals, and 30 minutes for all other species).

Ramp-Up of Survey Equipment

When technically feasible, a ramp-up procedure will be used for boomers, sparkers, and non-impulsive, non-parametric sub-bottom profilers capable of adjusting energy levels

at the start or re-start of survey activities. The ramp-up procedure will be used at the beginning of HRG survey activities in order to provide additional protection to marine mammals in the Survey Area by allowing them to vacate the area prior to the commencement of survey equipment operation at full power.

A ramp-up will begin with the powering up of the smallest acoustic HRG equipment at its lowest practical power output appropriate for the survey. When technically feasible, the power will then be gradually turned up and other acoustic sources will be added.

Ramp-up activities will be delayed if a marine mammal(s) enters its respective EZ, and may only recommence if the animal has been observed exiting its respective EZ or until an additional time period has elapsed with no further sighting (*i.e.*, 15 minutes for small odontocetes and seals, and 30 minutes for all other species).

Activation of survey equipment through ramp-up procedures may not occur when visual observation of the pre-clearance zone is not expected to be effective (*i.e.*, during inclement conditions such as heavy rain or fog). The Exclusion Zone must be fully visible during pre-start clearance and ramp-up operations.

Shutdown Procedures

An immediate shutdown of boomers and sparkers will be required if a marine mammal is sighted entering or within its respective EZ. No shutdown is required for surveys operating only non-impulsive acoustic sources (including non-parametric sub-bottom profilers). The vessel operator must comply immediately with any call for shutdown by the Lead PSO. Any disagreement between the Lead PSO and vessel operator should be discussed only after shutdown has occurred. Subsequent restart of the

survey equipment can be initiated if the animal has been observed exiting its respective EZ or after an additional time period has elapsed since the observation (*i.e.*, 15 minutes for small odontocetes and seals and 30 minutes for all other species).

If a species for which authorization has not been granted, or, a species for which authorization has been granted but the authorized number of takes have been met, approaches or is observed within the Level B harassment zone (54 m, non-impulsive; 141 m impulsive), shutdown will occur.

If the acoustic source is shut down for reasons other than mitigation (*e.g.*, mechanical difficulty) for less than 30 minutes, it may be activated again without ramp-up if PSOs have maintained constant observation and no detections of any marine mammal have occurred within the respective EZs. If the acoustic source is shut down for a period longer than 30 minutes and PSOs have maintained constant observation, then pre-start clearance and ramp-up procedures will be initiated as described in the previous section.

The shutdown requirement is waived for small delphinids of the following genera: *Delphinus*, *Lagenorhynchus*, *Stenella*, and *Tursiops*. Specifically, if a delphinid from the specified genera is visually detected approaching the vessel or towed equipment, shutdown is not required. Furthermore, if there is uncertainty regarding identification of a marine mammal species (*i.e.*, whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived), PSOs must use best professional judgement in making the decision to call for a shutdown. Additionally, shutdown is required if a delphinid is detected in the EZ and belongs to a genus other than those specified.

Vessel Strike Avoidance

Vessel strike avoidance measures include, but are not limited to, the following, except under circumstances when complying with these measures would put the safety of the vessel or crew at risk:

- All vessel operators and crews must maintain a vigilant watch for all protected species and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any protected species. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel (distances stated below). Visual observers monitoring the vessel strike avoidance zone may be third-party observers (*i.e.*, PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training to 1) distinguish protected species from other phenomena and 2) broadly to identify a marine mammal as a North Atlantic right whale, other whale (defined in this context as sperm whales or baleen whales other than North Atlantic right whales), or other marine mammal.
- All vessels must observe a 10-knot speed restriction in specific areas designated by NMFS for the protection of North Atlantic right whales from vessel strikes: any dynamic management areas (DMAs) when in effect and the Mid-Atlantic SMAs (from November 1 through April 30). See www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales for specific detail regarding these areas.

- Vessel speeds must also be reduced to 10 knots or less when any large whale, mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel.
- All vessels must maintain a minimum separation distance of 500 m from North Atlantic right whales. If a whale is observed but cannot be confirmed as a species other than a right whale, the vessel operator must assume that it is a right whale and take appropriate action.
- All vessels must maintain a minimum separation distance of 100 m from sperm whales and all other baleen whales.
- All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an understanding that at times this may not be possible (*e.g.*, for animals that approach the vessel).
- When protected species are sighted while a vessel is underway, the vessel shall take action as necessary to avoid violating the relevant separation distance (*e.g.*, attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If a NARW is sighted within the relevant separation distance, the vessel must steer a course away at 10 knots or less until the 500 m separation distance has been established.
- These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply.

Seasonal Restrictions

Ørsted will limit to three the number of survey vessels that will operate concurrently from January through May within the Lease Areas (OSC-A 0486/0517, OCS-A 0487, and OCS-A 500) and ECR Area north of the Lease Areas up to, but not including, coastal and bay waters. Ørsted will operate either a single vessel, two vessels concurrently or, for short periods, no more than three survey vessels concurrently in the Survey Area from January through May, when North Atlantic right whale densities are high (Roberts 2020). This practice will help to reduce the number of right whale takes and minimize the extent to which right whales may be exposed to project noise in a day.

Between watch shifts, members of the monitoring team will consult NOAA Fisheries North Atlantic right whale reporting systems for the presence of right whales throughout survey operations. The Survey Area occurs near the SMAs located off the coast of Rhode Island (Block Island Sounds SMA) and at the entrance to New York Harbor (New York Bight SMA). If survey vessels transit through these SMAs, they must adhere to the seasonal mandatory speed restrictions from November 1 through April 30. Throughout all survey operations, Ørsted will monitor NOAA Fisheries North Atlantic right whale reporting systems for the establishment of a DMA. If NOAA Fisheries should establish a DMA in the Survey Area, the vessels will abide by speed restrictions in the DMA per the lease condition.

Based on our evaluation of the required measures, as well as other measures considered by NMFS, NMFS has determined that these mitigation measures provide the means of effecting the least practicable impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an IHA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.

- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).
- Mitigation and monitoring effectiveness.

Monitoring Measures

Visual monitoring will be performed by qualified, NMFS-approved PSOs, the resumes of whom will be provided to NMFS for review and approval prior to the start of survey activities. Ørsted will employ independent, dedicated, trained PSOs, meaning that the PSOs must 1) be employed by a third-party observer provider, 2) have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammals and mitigation requirements (including brief alerts regarding maritime hazards), and 3) have successfully completed an approved PSO training course appropriate for their designated task and/or have demonstrated experience in the role of independent PSO during a geophysical survey. On a case-by-case basis, non-independent observers may be approved by NMFS for limited, specific duties in support of approved, independent PSOs on smaller vessels with limited crew capacity operating in nearshore waters.

The PSOs will be responsible for monitoring the waters surrounding each survey vessel to the farthest extent permitted by sighting conditions, including EZs, during all HRG survey operations. PSOs will visually monitor and identify marine mammals, including those approaching or entering the established EZs during survey activities. It will be the responsibility of the Lead PSO on duty to communicate the presence of

marine mammals as well as to communicate the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate.

During all HRG survey operations (*e.g.*, any day on which use of an HRG source is planned to occur), a minimum of one PSO must be on duty during daylight operations on each survey vessel, conducting visual observations at all times when acoustic sources are active. Two PSOs will be on watch during nighttime operations. PSO(s) will ensure 360° visual coverage around the vessel from the most appropriate observation posts and will conduct visual observations using binoculars and/or NVDs and the naked eye while free from distractions and in a consistent, systematic, and diligent manner. PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least two hours between watches and may conduct a maximum of 12 hours of observation per 24-hour period. In cases where multiple vessels are surveying concurrently, any observations of marine mammals will be communicated to PSOs on all nearby survey vessels.

PSOs must be equipped with binoculars and have the ability to estimate distance and bearing to detected marine mammals, particularly in proximity to EZs. Reticulated binoculars must also be available to PSOs for use as appropriate based on conditions and visibility to support the sighting and monitoring of marine mammals. During nighttime operations, night-vision goggle with thermal clip-ons and infrared technology will be used. Position data will be recorded using hand-held or vessel GPS units for each sighting.

During good conditions (*e.g.*, daylight hours; Beaufort sea state (BSS) 3 or less), to the maximum extent practicable, PSOs will also conduct observations when the acoustic source is not operating for comparison of sighting rates and behavior with and

without use of the active acoustic sources. Any observations of marine mammals by crew members aboard any vessel associated with the survey will be relayed to the PSO team.

Data on all PSO observations will be recorded based on standard PSO collection requirements. This will include dates, times, and locations of survey operations; dates and times of observations, location and weather; details of marine mammal sightings (*e.g.*, species, numbers, behavior); and details of any observed marine mammal behavior that occurs (*e.g.*, noted behavioral disturbances).

Reporting

Within 90 days after completion of survey activities, a final technical report will be provided to NMFS that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, summarizes the number of marine mammals observed during survey activities (by species, when known), summarizes the mitigation actions taken during surveys (including what type of mitigation and the species and number of animals that prompted the mitigation action, when known), and provides an interpretation of the results and effectiveness of all mitigation and monitoring. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS.

In addition to the final technical report, Ørsted will provide the reports described below as necessary during survey activities.

In the event that Ørsted personnel discover an injured or dead marine mammal, Ørsted must report the incident to the NMFS Office of Protected Resources (OPR) and the NMFS New England / Mid-Atlantic Stranding Coordinator as soon as feasible. The report must include the following information:

- Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
- Species identification (if known) or description of the animal(s) involved;
- Condition of the animal(s) (including carcass condition if the animal is dead);
- Observed behaviors of the animal(s), if alive;
- If available, photographs or video footage of the animal(s); and
- General circumstances under which the animal was discovered.

In the unanticipated event of a ship strike of a marine mammal by any vessel involved in the activities covered by the IHA, Ørsted must report the incident to the NMFS OPR and the NMFS New England / Mid-Atlantic Stranding Coordinator as soon as feasible. The report must include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Species identification (if known) or description of the animal(s) involved;
- Vessel's speed during and leading up to the incident;
- Vessel's course/heading and what operations were being conducted (if applicable);
- Status of all sound sources in use;
- Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;
- Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, visibility) immediately preceding the strike;

- Estimated size and length of animal that was struck;
- Description of the behavior of the marine mammal immediately preceding and following the strike;
- If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
- Estimated fate of the animal (*e.g.*, dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
- To the extent practicable, photographs or video footage of the animal(s).

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be “taken” through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS’s implementing regulations (54 FR 40338;

September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, our analysis applies to all the species listed in Table 1, given that NMFS expects the anticipated effects of the surveys to be similar in nature. NMFS does not anticipate that serious injury or mortality will occur as a result from HRG surveys, even in the absence of mitigation, and no serious injury or mortality is authorized. As discussed in the **Potential Effects** section, non-auditory physical effects and vessel strike are not expected to occur. We expect that all potential takes would be in the form of short-term Level B behavioral harassment in the form of temporary avoidance of the area or decreased foraging (if such activity was occurring), reactions that are considered to be of low severity and with no lasting biological consequences (*e.g.*, Southall *et al.*, 2007). Even repeated Level B harassment of some small subset of an overall stock is unlikely to result in any significant realized decrease in viability for the affected individuals, and thus would not result in any adverse impact to the stock as a whole. As described above, Level A harassment is not expected to occur given the nature of the operations, the estimated size of the Level A harassment zones, and the required shutdown zones for certain activities.

In addition to being temporary, the maximum expected harassment zone around a survey vessel is 141 m; almost half of survey days will include activity with a reduced acoustic harassment zone of 54 m per vessel, producing expected effects of particularly low severity. Consequently, the ensonified area surrounding each vessel is relatively

small compared to the overall distribution of the animals in the area and their use of the habitat. Feeding behavior is not likely to be significantly impacted as prey species are mobile and are broadly distributed throughout the Survey Area; therefore, marine mammals that may be temporarily displaced during survey activities are expected to be able to resume foraging once they have moved away from areas with disturbing levels of underwater noise. Because of the temporary nature of the disturbance and the availability of similar habitat and resources in the surrounding area, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

ESA-listed species for which takes are authorized are North Atlantic right, fin, sei, and sperm whales; impacts on these species are anticipated to be limited to lower level behavioral effects. NMFS does not anticipate that serious injury or mortality will occur to ESA-listed species, even in the absence of mitigation, and this authorization does not authorize any serious injury or mortality. The survey activities are not anticipated to affect the fitness or reproductive success of individual animals. Since impacts to individual survivorship and fecundity are unlikely, the survey activities are not expected to result in population-level effects for any ESA-listed species or alter current population trends of any ESA-listed species.

The status of the North Atlantic right whale population is of heightened concern, and merits additional analysis. In July 2020, the International Union for the Conservation of Nature (IUCN) moved the right whale from Endangered to Critically Endangered on the IUCN Red List. An increasing trend in right whale mortalities began in June 2017, primarily in Canada. Overall, preliminary findings support human interactions,

specifically vessel strikes and entanglements, as the cause of death for the majority of right whales. The Survey Area includes a biologically important migratory route for right whales (effective March-April and November-December) that extends from Massachusetts to Florida (LeBrecque *et al.*, 2015). Off the south coast of Massachusetts and Rhode Island, this biologically important migratory area extends from the coast to beyond the shelf break. However, in recent years, the temporal and spatial scales of right whale distribution and migratory patterns have shifted (*e.g.*, Gowan *et al.*, 2019), and right whales are now observed year-round south of Martha's Vineyard and Nantucket (northeast of the Survey Area) (Pettis *et al.*, 2020). The spatial acoustic footprint of the survey is very small relative to the spatial extent of the available migratory habitat, thus, right whale migration is not expected to be impacted by the survey. As previously described, Seasonal Restrictions must be implemented to limit both the amount of vessel activity and acoustic impact of Ørsted's survey activities on right whales utilizing the habitat that overlaps with the Survey Area. Required vessel strike avoidance measures will also decrease risk of ship strike during migration, although no ship strike is expected to occur. Additionally, Ørsted is required to maintain a 500 m EZ and shutdown if a right whale is sighted at or within the EZ. The 500 m shutdown zone for right whales is conservative, considering the Level B harassment isopleth for the most impactful acoustic source (*i.e.*, GeoMarine Geo-Source 400 tip sparker) is estimated to be 141 m, and thereby minimizes the potential for behavioral harassment of this species. Finally, all survey vessels are required to maintain a 500 m separation distance from right whales, at all times.

The Survey Area includes a fin whale feeding BIA, effective between March and October. The fin whale feeding area is sufficiently large (2,933 km²), and the acoustic footprint of the survey is sufficiently small that whale feeding habitat would not be reduced in any way, and any impacts to foraging behavior within the habitat are expected to be minimal. Behavioral harassment is typically context-dependent, and current literature demonstrates that some mysticetes are less likely to be susceptible to disruption of behavioral patterns when engaged in feeding (Southall *et al.*, 2007; Goldbogen *et al.*, 2013; Harris *et al.*, 2019). Any fin whales temporarily displaced from the Survey Area would be expected to have sufficient habitat available to them and would not be prevented from feeding in other areas within the biologically important feeding habitat. In addition, any displacement of fin whales from the BIA would be expected to be temporary in nature. Therefore, we do not expect fin whale feeding to be negatively impacted by the survey.

As noted previously, there are several active UMEs occurring in the vicinity of Ørsted's Survey Area. Elevated humpback whale mortalities have occurred along the Atlantic coast from Maine through Florida since January 2016. Of the cases examined, approximately half had evidence of human interaction (ship strike or entanglement). The UME does not yet provide cause for concern regarding population-level impacts. Despite the UME, the relevant population of humpback whales (the West Indies breeding population, or distinct population segment (DPS)) remains stable at approximately 12,000 individuals.

Beginning in January 2017, elevated minke whale strandings have occurred along the Atlantic coast from Maine through South Carolina, with highest numbers in

Massachusetts, Maine, and New York. This event does not provide cause for concern regarding population level impacts, as the likely population abundance is greater than 20,000 whales.

Elevated numbers of harbor seal and gray seal mortalities were first observed in July 2018 and have occurred across Maine, New Hampshire, and Massachusetts. Based on tests conducted so far, the main pathogen found in the seals is phocine distemper virus, although additional testing to identify other factors that may be involved in this UME are underway. The UME does not yet provide cause for concern regarding population-level impacts to any of these stocks. For harbor seals, the population abundance is over 75,000 and annual M/SI (350) is well below PBR (2,006) (Hayes *et al.*, 2018). The population abundance for gray seals in the United States is over 27,000, with an estimated overall abundance, including seals in Canada, of approximately 505,000. In addition, the abundance of gray seals is likely increasing in the U.S. Atlantic EEZ as well as in Canada (Hayes *et al.*, 2018).

The required mitigation measures are expected to reduce the number and/or severity of takes by providing animals the opportunity to move away from the sound source throughout the Survey Area before HRG survey equipment reaches full energy, thus preventing animals from being exposed to sound levels that have the potential to cause injury (Level A harassment) or more severe Level B harassment. No Level A harassment is anticipated or authorized.

NMFS expects that takes would be in the form of short-term Level B behavioral harassment by way of brief startling reactions and/or temporary vacating of the area, or decreased foraging (if such activity was occurring)—reactions that (at the scale and

intensity anticipated here) are considered to be of low severity, with no lasting biological consequences. Since both the sources and marine mammals are mobile, animals would only be exposed briefly to a small ensonified area that might result in take. Additionally, required mitigation measures would further reduce exposure to sound that could result in more severe behavioral harassment.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No mortality or serious injury is anticipated or authorized;
- No Level A harassment (PTS) is anticipated or authorized;
- Foraging success is not likely to be significantly impacted as effects on species that serve as prey species for marine mammals from the survey are expected to be minimal;
- The availability of alternate areas of similar habitat value for marine mammals to temporarily vacate the survey area during the planned survey to avoid exposure to sounds from the activity;
- Take is anticipated to be Level B behavioral harassment, consisting of brief startling reactions and/or temporary avoidance of the Survey Area;
- While the Survey Area is within areas noted as biologically important for North Atlantic right whale migration, the survey activities will occur in such a comparatively small area such that any avoidance of the Survey Area due to survey activities would not affect migration. Seasonal vessel restrictions from January through May will further reduce the potential overall impacts of

survey activities on NARWs utilizing habitat in or near the Survey Area. In addition, the mitigation measure to shutdown if a North Atlantic right whale is observed nearing or entering the 500 m EZ would limit any take of the species. Similarly, due to the small footprint of the survey activities in relation to the size of a biologically important area for fin whales' foraging, the survey activities would not affect foraging success of this species; and

- The required mitigation measures, including visual monitoring and shutdowns, are expected to minimize potential impacts to marine mammals.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, NMFS finds that the total marine mammal take from the planned activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is less than one third of the species or stock abundance, the take is considered to be of small numbers.

Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

We authorize incidental take of fifteen marine mammal stocks. The numbers of marine mammals for which we authorize take, for all species and stocks, are small relative to the relevant stocks or populations (less than 9 percent for all species and stocks) as shown in Table 6. Based on the analysis contained herein of the planned activity (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population size of all affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally, in this case with the NMFS Greater Atlantic Regional Fisheries Office (GARFO), whenever we propose to authorize take for endangered or threatened species. Within the Survey Area, fin, sei, humpback, North Atlantic right, and sperm whales are listed as endangered

species under the ESA. Under section 7 of the ESA, BOEM consulted with NMFS on commercial wind lease issuance and site assessment activities on the Atlantic Outer Continental Shelf in Massachusetts, Rhode Island, New York, and New Jersey Wind Energy Areas. NOAA's GARFO issued a Biological Opinion concluding that these activities may adversely affect but are not likely to jeopardize the continued existence of the North Atlantic right, fin, sei, and sperm whale. The Biological Opinion can be found online at: <https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-biological-opinions-greater-atlantic-region>. Upon request from the NMFS Office of Protected Resources, NMFS GARFO issued an amended incidental take statement associated with this Biological Opinion to include the take of the ESA-listed marine mammal species authorized through this IHA in September, 2020.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216-6A, NMFS must evaluate our proposed action (*i.e.*, the promulgation of regulations and subsequent issuance of incidental take authorization) and alternatives with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 of the Companion Manual for NAO 216-6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that

would preclude this categorical exclusion. Accordingly, NMFS has determined that the planned action qualifies to be categorically excluded from further NEPA review.

Authorization

NMFS has issued an IHA to Ørsted for conducting marine site characterization surveys in coastal waters from New York to Massachusetts, for a period of one year, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: October 5, 2020.

Donna Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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